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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/912,589	07/24/2001	David P. Bour	M-8772 US	7208

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EXAMINER

LOUIE, WAI SING

ART UNIT PAPER NUMBER

2814

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/912,589

Applicant(s)

BOUR ET AL.

Examiner

Wai-Sing Louie

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-17 and 25-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-17 and 25-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

- In claim 9, “at least two quantum well layers separated by a barrier layer” is claimed. However, each well layer is sandwiched by two barrier layers.

Therefore, there should be more than one barrier layer in this multiple quantum well.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 9, 11-13, 17, 25, and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Jewell et al. (US 5,960,018).

With regard to claims 9, 17, and 25, Jewell et al. disclose a method of forming a semiconductor laser device (col. 12, line 21 to col. 39, line 18 and fig. 10) comprising:

- Forming a first semiconductor layer 130 of a first conductivity type and having a first surface (fig. 10);
- Forming an active region 110 directly over the first semiconductor layer 130, the active region 110 including a plurality of quantum well layers. The quantum well layers 54 and 70 are separated by confining (barrier) layer 126, where one of the quantum well layer and the mole fraction of indium of the barrier layer is graded (col. 23, line 55 to col. 24, line 12, col. 25, lines 50-66, and fig. 5), formed from a III-nitride semiconductor alloy (col. 26, lines 55-65) having a composition graded in a direction substantially perpendicular to the first surface of the first semiconductor layer 130 (fig. 5);
- Forming a third semiconductor layer 132 of a second conductivity type over the active region 110 (fig. 10).

With regard to claims 11 and 27, Jewell et al. disclose the grading the composition of the III-nitride semiconductor alloy in the graded layer asymmetrically (fig. 5b-5f).

With regard to claims 12 and 28, Jewell et al. disclose grading the composition of the III-nitride semiconductor alloy in the graded layer would reduce the effect of a piezoelectric field in the active region 110 (col. 31, lines 6-27).

With regard to claims 13 and 29, Jewell et al. disclose grading the composition of the III-nitride semiconductor alloy in the graded layer would be graded linearly and would be appeared smoothly on the grading curve (col. 24, lines 8-12 and fig. 5f).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10, 14-16, 26, and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jewell et al. (US 5,960,018) in view of Tadatomo et al. (US 5,810,925)

With regard to claims 10 and 26, Jewell et al. disclose the semiconductor layers are made of III-nitride alloy, but do not disclose the graded layer has a wurtzite structure. However, it is well known in the art that an III-nitride alloy have a wurtzite crystal structure such as disclose in Tadatomo et al. (Tadatomo col. 5, lines 29-32). Therefore, the semiconductor graded layers in Jewell's device has a wurtzite structure.

With regard to claims 14 and 30, Jewell et al. disclose the III-nitride semiconductor alloy is InGaAsN (col. 26, line 56). However, Tadatomo et al. disclose the III-nitride semiconductor compound includes AlInGaN (Tadatomo col. 1, line 21). Tadatomo et al. teach the GaN group compound semiconductors includes binary and quaternary compound such as AlInGaN (Tadatomo col. 1, lines 17-22). Therefore, it would have been obvious for the one with ordinary

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skill in the art to modify Jewell's device with the teaching of Tadatomo et al. to include AlInGaN since AlInGaN is part of the III-nitride group.

With regard to claims 15-16 and 31-32, Jewell et al. disclose grading the strained quantum well in order to obtain thickness exceeding the critical thickness for the layer (col. 6, lines 15-60). Jewell et al. disclose the grading in the graded layer includes the mole fraction of indium to control the strain of the quantum well (col. 25, lines 50-66). Jewell et al. do not disclose grading the mole fraction of the aluminum. However, Jewell et al., modified by Tadatomo et al. in claim 14 above, would disclose the semiconductor compound AlInGaN used in the quantum well. Therefore, it would have been obvious the mole fraction could also be graded to control the strain in the quantum well layer.

Response to Arguments

Applicant's arguments with respect to claims 9-17 and 25-32 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

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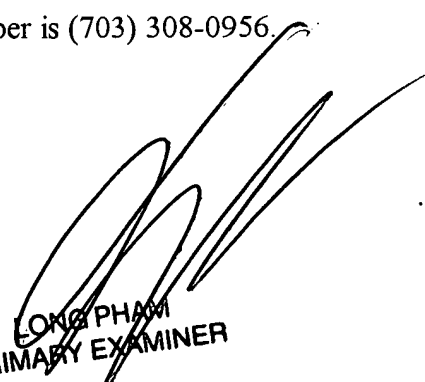
the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (703) 305-0474. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Wsl
September 8, 2003


LONG PHAM
PRIMARY EXAMINER